Presentation to:

California Debt and Investment Advisory Commission

Revealing OPEBs In Your Financials: Where the Rubber Meets the Road

California Case Studies – Asset Allocation for GASB 45 OPEB Liabilities

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Situation Analysis

GASB provides significant incentive to fund OPEB liabilities

- **GASB allows use of a higher discount rate for funded trust structures**
  - A higher discount rate reduces the Actuarial Accrued Liability
  - Pay-as-you go plans will use lower discount rates based on operating fund investment returns
- **Asset allocation for an OPEB trust needs to take into account actuarially projected cash flows**
  - Understanding both the contribution and liability streams is crucial
  - OPEB benefits are long-term in nature, unlike traditional public agency operating liabilities, justifying a different investment approach

Asset Allocation Basics

Asset allocation inherently implies some level of diversification

- **Improve long-term return potential**
- **Reduce impact of volatility and risk**
- **Provide greater relative stability**

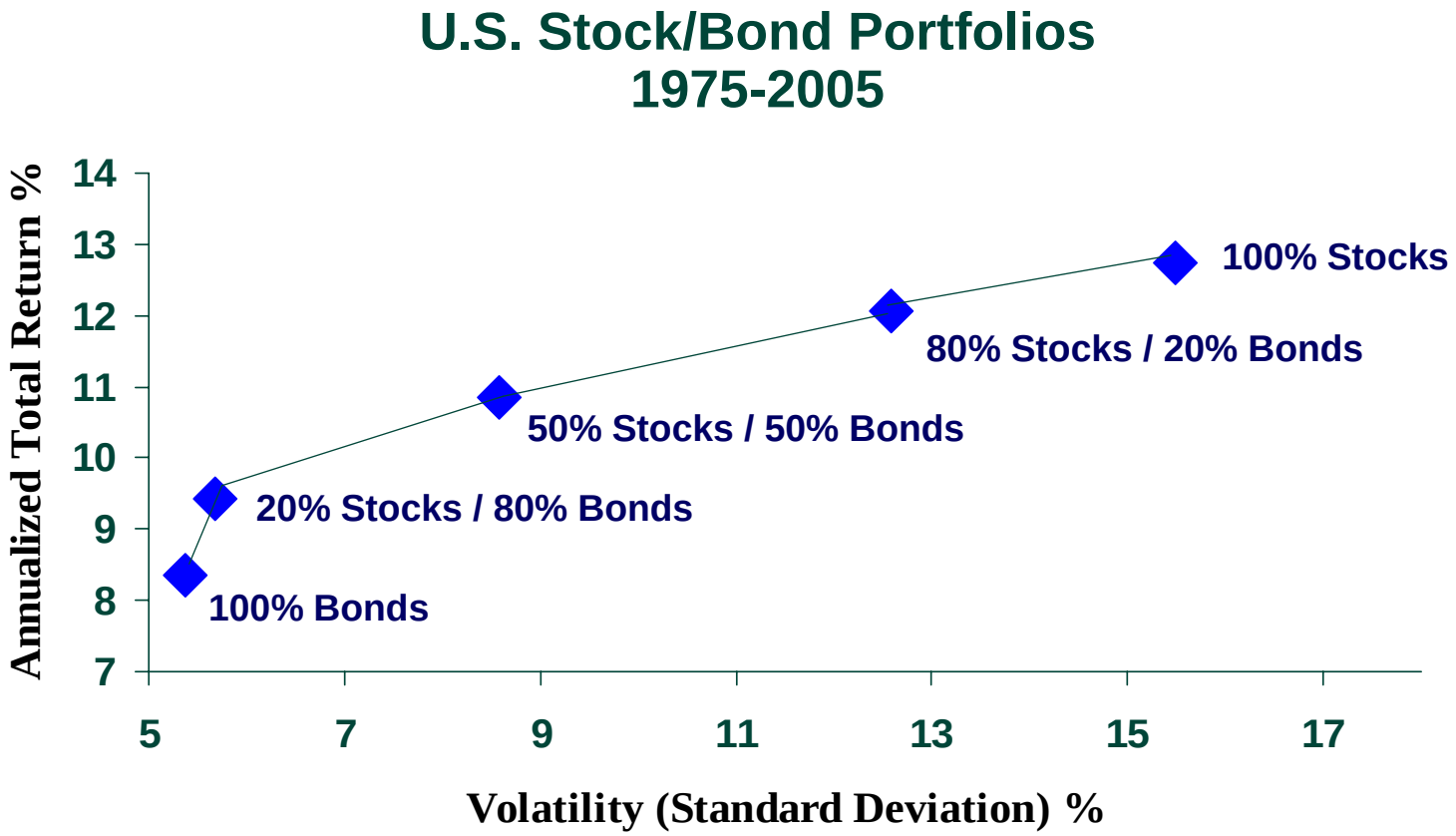
Modern Portfolio Theory
Harry Markowitz
Established link between diversification and investment risk reduction

Capital Asset Pricing Model (CAPM)
William Sharpe
Portfolio risks can be measured and managed

Markowitz and Sharpe received Nobel Prize in Economics in 1990

Risk / Return Analysis

Past data illustrates volatility vs. return "trade-offs" among asset classes

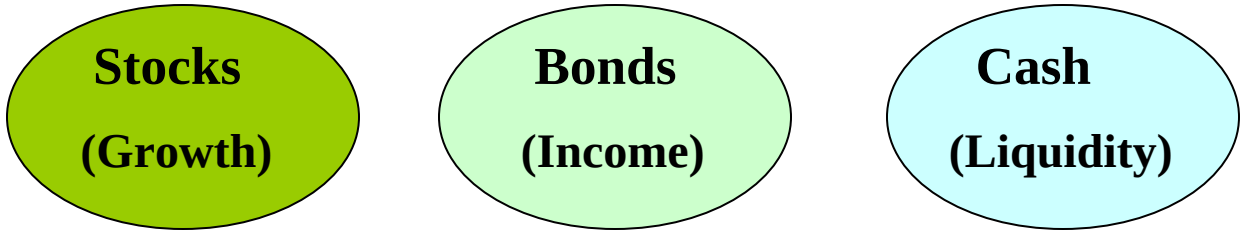


Source: Callan Associates. Stocks represented by S&P 500.
Bonds represented by the Lehman Brothers Intermediate Government/Credit Bond index.

The Premise of Asset Allocation

Three basic asset classes have distinct attributes and goals

- **Diversify among three main asset classes**



- **Capitalize on low-correlation of asset classes**

- **Avoid market timing and its pitfalls**

Twenty-years of Best-Performing Assets

No one asset class consistently outperforms

Year	Best-Performing Asset Class (Domestic)	Total Return
1986	Long-Term Government Bonds	24.5%
1987	U.S. Treasury Bills	5.5
1988	Small Company Stocks	24.9
1989	Large Company Stocks	31.5
1990	Intermediate-term Government Bonds	9.7
1991	Small Company Stocks	46.1
1992	Small Company Stocks	18.4
1993	Small Company Stocks	18.9
1994	U.S. Treasury Bills	3.9
1995	Large Company Stocks	37.4
1996	Large Company Stocks	23.1
1997	Large Company Stocks	33.4
1998	Large Company Stocks	28.6
1999	Small Company Stocks	21.3
2000	Long-Term Government Bonds	21.5
2001	Long-Term Government Bonds	10.7
2002	Long-Term Government Bonds	17.8
2003	Small Company Stocks	47.3
2004	Small Company Stocks	18.3
2005	Large Company Stocks	4.91

Liability Driven Investing

Liability driven investing is an alternative to traditional asset allocation

Traditional Approach

Risk Tolerance
\+ Time Horizon
➔ Investment Parameters

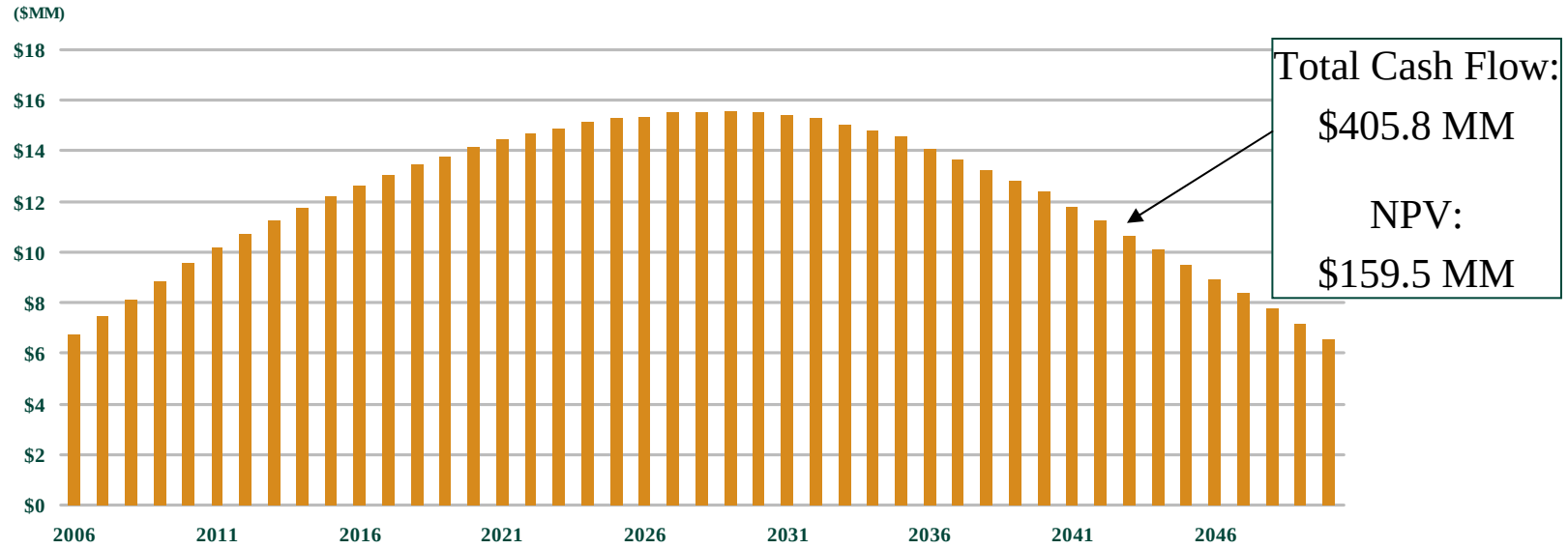
Liability Driven Investing

Liability Cash Flows
\+ Fixed Income Securities
➔ "Immunized" Portfolio

Immunization Analysis

Application to Peralta obligations illustrates liability driven investing

Liability Cash Flows



Immunization up to (year)	Assets Required
2050	$159.5 MM
2040	$149.5 MM
2036	$141.3 MM
2035	$138.7 MM

Yield Curve as of 9/30/05

Common Asset Allocation Considerations

A variety of considerations will affect asset allocation approach

Macroeconomic
◆ Inflation
◆ Interest rates
◆ GDP growth
◆ Consumer Spending
◆ Employment
◆ Balance of Payments
◆ Political & Social Factors

Fundamental
◆ Expected Returns
◆ Expected Volatility
◆ Corporate Earnings
◆ Correlation
◆ Investment Style / Activity Level
◆ Valuation
◆ Sentiment

Internal	
◆ Nature of Liability	◆ Risk “Tolerance” / Headline Risk
◆ Cash Flows	◆ Internal Management Capabilities
◆ Market Perspective	◆ Tools and Resources

Analytical Example

"Stress-testing" an investment strategy with a Monte Carlo simulation

- **Assumptions**
  - Initial Deposit = $150 million
  - Risk-free rate of return = 4.0%
  - Equal monthly withdrawals, each year
  - Number of simulations / trials = 3,000

- **Three Scenarios**
  - Historical Scenario
  - Optimistic Scenario
  - Base Scenario

Asset Allocation Assumptions for Monte Carlo Analysis

Simulation illustrates "expected" return and likely "deviation" in return

- **Asset allocation is input; results reveal "shortfall probabilities" of scenarios**

Asset Classes	***Portfolio Allocatiion***	Return Assumptions Historical	Optimistic	Base
USD Inv. Grade FI	***30.0%***	4.50%	4.00%	4.00%
US Lg. Cap Growth	***16.0%***	13.20%	12.21%	8.10%
US Lg. Cap Value	***16.0%***	13.20%	9.80%	6.90%
US Small Cap	***10.0%***	11.90%	12.12%	8.06%
Non-US Equity	***18.0%***	11.70%	10.38%	7.19%
Real Estate	***10.0%***	24.90%	6.99%	5.49%
Exp Return		11.36%	8.50%	6.25%
Std Dev		9.44%	9.44%	9.44%
Sharpe Ratio [1]		0.780	0.477	0.238

Conclusion

- GASB provides significant incentive to fund OPEB liabilities in a trust
- When liabilities are funded, the asset allocation and investment structure is critical
- A mix of security types – stocks, bonds and cash – offer growth, income and liquidity along with risk mitigation
- There are many tools and resources available to determine and implement an appropriate asset allocation structure